

CLAIMS

WHAT IS CLAIMED:

1. A built-in self-test controller including:
 - a memory built-in self-test engine capable of executing a memory built-in self-test;
 - and
 - a memory built-in self-test signature generated on execution of the memory built-in self-test.
2. The built-in self-test controller of claim 1, wherein the memory built-in self-test signature register includes the results of at least one paranoid check.
3. The built-in self-test controller of claim 1, wherein the memory built-in self-test signature includes a bit indicating whether the memory built-in self-test is done.
4. The built-in self-test controller of claim 1, wherein the memory built-in self-test engine comprises:
 - a memory built-in self-test state machine; and
 - a nested memory built-in self-test engine operating the memory built-in self-test state machine.
5. The built-in self-test controller of claim 4, wherein the memory built-in self-test state machine comprises:
 - a reset state entered upon receipt of an external reset signal;
 - an initiate state entered from the reset state upon receipt of at least one of a memory built-in self-test run signal and a memory built-in self-test select signal;
 - a flush state entered from the initiate state upon the initialization of components and signals in the memory built-in self-test domain in the initiate state;
 - a test state entered into from the flush state upon completing a flush of a plurality of memory components to a known state; and
 - a done state entered into upon completing the test of each of the memory components in the memory built-in self-test.
6. The built-in self-test controller of claim 1, wherein the memory built-in self-test engine comprises:

3 a plurality of alternative memory built-in self-test state machines; and
4 a nested memory built-in self-test engine operating a predetermined one of the
5 memory built-in self-test state machines.

1 7. The built-in self-test controller of claim 6, wherein each of the memory built-
2 in self-test engines comprises:

3 a reset state entered upon receipt of an external reset signal;
4 an initiate state entered from the reset state upon receipt of at least one of a memory
5 built-in self-test run signal and a memory built-in self-test select signal;
6 a flush state entered from the initiate state upon the initialization of components and
7 signals in the memory built-in self-test domain in the initiate state;
8 a test state entered into from the flush state; and
9 a done state entered into upon completing the test of each of a plurality of memory
10 components in the memory built-in self-test.

11 8. The built-in self-test controller of claim 1, further comprising:
12 a logic built-in self-test engine capable of executing a logic built-in self-test and
13 storing the results thereof; and
14 a multiple input signature register capable of storing the results of an executed logic
15 built-in self-test.

16 9. A built-in self-test controller including:
17 means for executing a memory built-in self-test; and
18 means for storing the results generated on execution of the memory executing means.

19 10. The built-in self-test controller of claim 9, wherein the memory storing means
20 includes the results of at least one paranoid check.

21 11. The built-in self-test controller of claim 9, wherein the memory storing means
22 includes a bit indicating whether the memory built-in self-test is done.

23 12. The built-in self-test controller of claim 9, wherein the memory executing
24 means comprises:
25 a memory built-in self-test state machine; and
26 a nested memory built-in self-test engine operating the memory built-in self-test state
27 machine.

13. The built-in self-test controller of claim 9, wherein the memory executing means comprises:

- a plurality of alternative memory built-in self-test state machines; and
- a nested memory built-in self-test engine operating a predetermined one of the memory built-in self-test state machines.

14. The built-in self-test controller of claim 9, further comprising:

- means for executing a logic built-in self-test and storing the results thereof; and
- means for storing the results of an executed logic built-in self-test.

15. A integrated circuit device including:

- a plurality of memory components;
- a testing interface; and
- a built-in self-test controller controlled through the testing interface, the built-in self-test controller including:
 - a memory built-in self-test engine capable of performing a memory built-in self-test; and
 - a memory built-in self-test signature generated upon an execution of the memory built-in self-test.

16. The integrated circuit device of claim 15, wherein the memory built-in self-test signature register is further capable of storing the results of at least one paranoid check.

17. The integrated circuit device of claim 15, wherein the memory built-in self-test signature register includes a bit indicating whether the memory built-in self-test is done.

18. The integrated circuit device of claim 15, wherein the memory built-in self-test engine comprises:

- a memory built-in self-test state machine; and
- a nested memory built-in self-test engine operating the memory built-in self-test state machine.

19. The integrated circuit device of claim 15, wherein the memory built-in self-test state machine comprises:

- a reset state entered upon receipt of an external reset signal;

an initiate state entered from the reset state upon receipt of at least one of a memory built-in self-test run signal and a memory built-in self-test select signal;
a flush state entered from the initiate state upon the initialization of components and signals in the memory built-in self-test domain in the initiate state;
a test state entered into from the flush state; and
a done state entered into upon completing the test of each of a plurality of memory components in the memory built-in self-test.

20. The integrated circuit device of claim 15, wherein the memory built-in self-test engine comprises:

a plurality of alternative memory built-in self-test state machines; and
a nested memory built-in self-test engine operating a predetermined one of the memory built-in self-test state machines.

21. The integrated circuit device of claim 15, wherein the memory components include a static random access memory device.

22. The integrated circuit device of claim 15, wherein the testing interface comprises a Joint Test Action Group tap controller.

23. The integrated circuit device of claim 15, further comprising:
a logic built-in self-test engine capable of executing a logic built-in self-test and storing the results thereof; and
a multiple input signature register capable of storing the results of an executed logic built-in self-test.

24. A method for performing a memory built-in self-test, the method comprising:
externally resetting a memory built-in self-test engine and a memory built-in self-test signature;
generating the memory built-in self-test signature upon an execution of a memory built-in self-test by the memory built-in self-test engine; and
reading the generated memory built-in self-test signature.

25. The method of claim 24, wherein the execution of the memory built-in self-test includes:

initiating a plurality of components and signals in a memory built-in self-test engine and the memory built-in self-test signature upon receipt of at least one of a memory built-in self-test run signal and a memory built-in self-test select signal;

flushing the contents of a plurality of memory components to a known state after initialization of the components and the signals; and
testing the flushed memory components.

26. The method of claim 25, wherein generating the memory built-in self-test signature includes:

storing the results of the testing in a memory built-in self-test signature register.

27. The method of claim 24, wherein generating the memory built-in self-test signature includes storing the results of the testing in a memory built-in self-testing register.

28. The method of claim 24, wherein performing the memory built-in self-test further includes at least one of:

performing at least one paranoid check; and

storing the results of the paranoid check in the memory built-in self-test signature register.

29. The method of claim 24, wherein performing the memory built-in self-test further includes setting a bit in the memory built-in self-test signature indicating whether the memory built-in self-test is done.

30. The method of claim 24, wherein externally resetting the memory built-in self-test engine includes externally resetting a memory built-in self-test engine including:

a memory built-in self-test state machine; and

a nested memory built-in self-test engine.

31. The method of claim 30, wherein externally resetting the memory built-in self-test state machine includes externally resetting one of a plurality of memory built-in self-test state machines.

32. The method of claim 30, wherein flushing the contents of the memory components includes flushing the contents of a plurality of static random access memories.

1 33. A method for performing a built-in self-test on an integrated circuit device, the
2 method comprising:

3 interfacing the integrated circuit device with a tester;

4 performing a memory built-in self-test, including:

5 externally resetting a memory built-in self-test engine and a memory built-in
6 self-test signature;

7 generating the memory built-in self-test signature upon an execution of a
8 memory built-in self-test by the memory built-in self-test engine; and

9 reading the generated memory built-in self-test signature.

1 34. The method of claim 33, wherein the execution of the memory built-in self-
2 test includes:

3 initiating a plurality of components and signals in a memory built-in self-test
4 engine and the memory built-in self-test signature register upon receipt
5 of at least one of a memory built-in self-test run signal and a memory
6 built-in self-test select signal;

7 flushing the contents of a plurality of memory components to a known state
8 after initialization of the components and the signals in the memory
9 built-in self-test domain; and

10 testing the flushed memory components.

1 35. The method of claim 33, wherein generating the memory built-in self-test
2 signature includes storing the results in a memory built-in self-test signature register.

1 36. The method of claim 33, wherein performing the memory built-in self-test
2 further includes at least one of:

3 performing at least one paranoid check; and

4 storing the results of the paranoid check in the memory built-in self-test signature
5 register.

1 37. The method of claim 33, wherein performing the memory built-in self-test
2 further includes setting a bit in the memory built-in self-test signature indicating whether the
3 memory built-in self-test is done.

1 38. The method of claim 33, wherein externally resetting the memory built-in self-
2 test engine includes externally resetting a memory built-in self-test engine including:
3 a memory built-in self-test state machine; and
4 a nested memory built-in self-test engine.

1 39. The method of claim 33, further comprising:
2 performing a logic built-in self-test; and
3 reading the results of the logic built-in self-test.